

# Affordable, Lightweight, Compactly Stowable, High Strength / Stiffness Lander Solar Array, Phase II

Completed Technology Project (2017 - 2021)



## Project Introduction

Deployable Space Systems, Inc. (DSS) has developed a next-generation high performance solar array system specifically for NASA's future Lander and sample return missions. The proposed Lander solar array has game-changing performance metrics in terms of extremely high specific power, ultra-compact stowage volume, affordability, low risk, high environmental survivability/operability, high power and growth capability, high deployed strength and high strength during deployment (for mission environments that have high gravity and wind loading from atmospheres such as Mars), high deployed stiffness, high reliability, retraction and re-deployment capability, and broad modularity / adaptability to many missions. The proposed innovation is a tensioned membrane blanket solar array that stows very compactly with no auxiliary components extending beyond the stowed volume envelope of the stowed flexible blanket assembly, and when deployed becomes structurally pre-tensioned to create a deployed rigid body 'tensegrity-like' configuration that exhibits very high deployed strength and stiffness. The proposed technology innovation significantly enhances Lander and sample return vehicle capabilities through its enabling performance and by providing a low cost alternative renewable power generating system in place of the very expensive standard RTG systems currently being used. The proposed innovation greatly increases performance and autonomy/mobility, decreases risk, and ultimately enables missions.

## Anticipated Benefits

NASA space applications are comprised of practically all Exploration, Space Science, Earth Science, Planetary Surface, and other missions that require affordable high-efficiency photovoltaic power production through of an ultra-lightweight, ultra-compact stowage, high strength and stiffness, and highly-modular solar array system. The technology is particularly suited for Lander and sample return missions that require game-changing performance in terms of affordability, high power, compact stowed packaging, high deployed strength and stiffness, unsupported deployment in 1G, and lightweight. The technology is suitable for NASA LEO, MEO & GEO, and interplanetary missions. Non-NASA space applications are comprised of practically all missions that require affordable high-efficiency photovoltaic power production through deployment of an ultra-lightweight, ultra-compact stowage, high strength and stiffness, affordable, and highly-modular solar array system. Potential non-NASA commercial and DoD applications span a broad range of applications that demand ultra-compact stowage and very high strength and stiffness. The technology is suitable for non-NASA LEO, MEO & GEO missions. The technology is particularly suited for reconnaissance missions that require game-changing performance in terms of affordability, ultra-lightweight, compact stowage volume, and high deployed strength and stiffness.



Affordable, Lightweight, Compactly Stowable, High Strength / Stiffness Lander Solar Array, Phase II Briefing Chart Image

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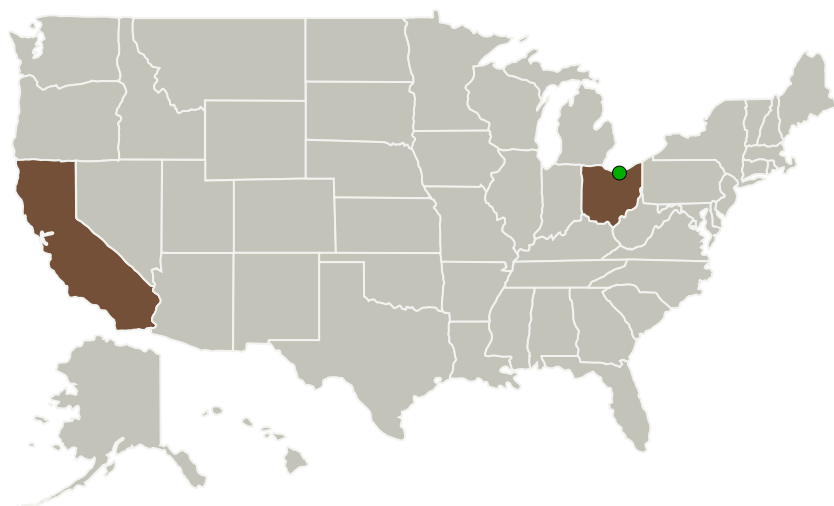
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## Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Deployable Space Systems, Inc(DSS)	Lead Organization	Industry	Goleta, California
● Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
California	Ohio

## Project Transitions

▶ **June 2017:** Project Start

✓ **March 2021:** Closed out

### Closeout Documentation:

- Final Summary Chart PDF(<https://techport.nasa.gov/file/141156>)

## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

### Lead Organization:

Deployable Space Systems, Inc (DSS)

### Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

### Program Director:

Jason L Kessler

### Program Manager:

Carlos Torrez

### Project Managers:

Anna Maria T Pal  
Matthew C Deans

### Principal Investigator:

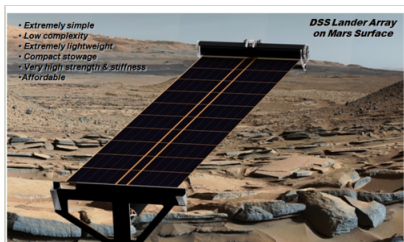
Brian Spence

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## Images



### Briefing Chart Image

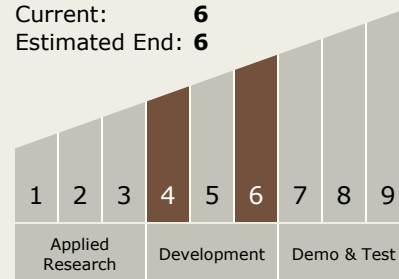
Affordable, Lightweight, Compactly Stowable, High Strength / Stiffness Lander Solar Array, Phase II

Briefing Chart Image

(<https://techport.nasa.gov/image/126358>)

## Technology Maturity (TRL)

Start: 4  
Current: 6  
Estimated End: 6



## Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System